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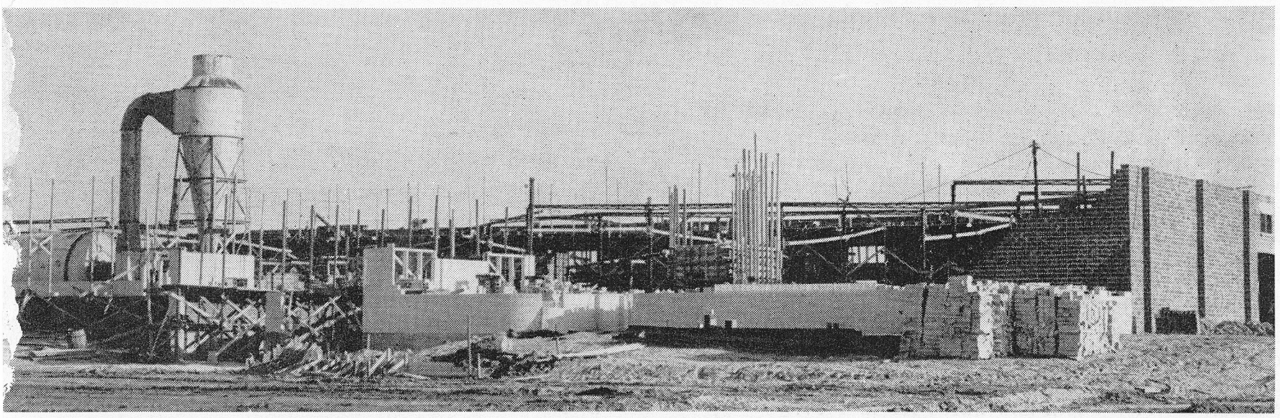

1957 Outlook Issue

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January Iowa Farm Science Reprints

(available about mid-month)

FS-688 Recommended Crop Varieties for 1957
FS-689 Soil Moisture Situation—1957
FS-690 Plant Disease Outlook for 1957
FS-691 Livestock Disease Situation—1957
FS-692 Insect and Rodent Prospects for 1957
FS-693 Farm Custom Rates for 1957
FS-694 How Much Tractor Fuel for Field Work?

chat with the editors

CAN WE SERVE YOU BETTER? . . .

Our first "all-outlook" issue of Iowa Farm Science was published several years ago. We didn't get much immediate reaction, so we skipped the following year.

But the all-outlook issue turned out to be what we call a "sleeper." The reaction when we didn't come through with an outlook issue the following January was both immediate and definite. Thus, we published another outlook issue a year ago and are publishing this one for 1957.

These outlook issues represent a departure from the usual issues which are mainly devoted to presenting the results of farm and home research. For the outlook issues, we draw not only on the results of research, but also on the accumulated knowledge and experience of the various authors. The purpose is to provide what we hope will be helpful information in making your plans for the coming year.

If you have suggestions on how these issues might be made more useful to you -- by adding new sections or dropping other sections, for example -- please let us know.

Your comments and suggestions on how we and Iowa Farm Science might serve you better are always welcome.

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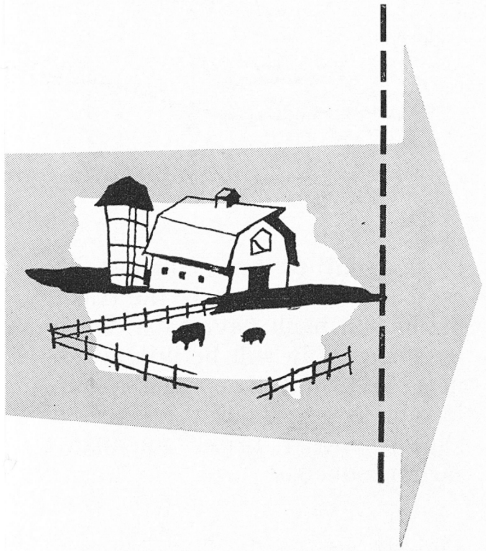


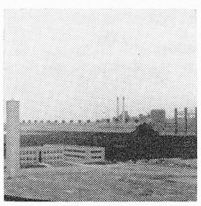
Farm Outlook . . . for 1957

Farm incomes are expected to creep up in 1957, but costs will, too. So the average picture is much like that of last year. The main differences from 1956 will be among individual items and commodities. Here's how it looks:

BUSINESS in the cities will be as good—or probably a little better—this year than in 1956. So there should be a continued strong demand for farm products.

Hog prices will be rising in 1957. This, plus soil bank payments, should mean higher incomes for Iowa farmers this year. But higher production costs are also ahead.

The major problems still continue. We in agriculture are producing a little too much in total to get the kind of prices we'd like to get. This condition will continue in 1957.



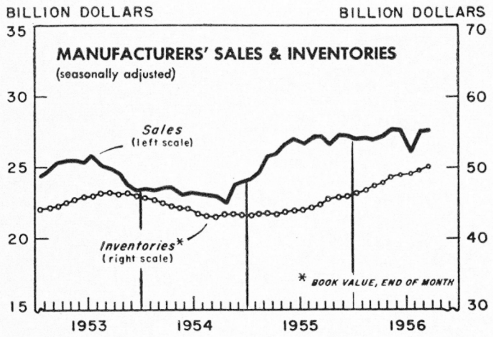
Business

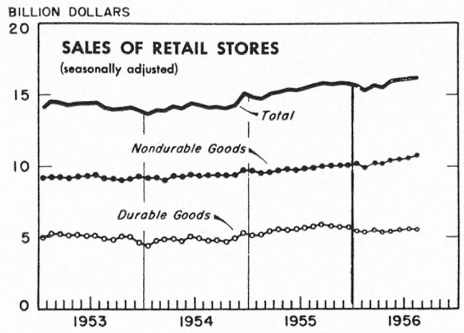
Business activity again approaches the limits set by manpower, materials and plant capacity. The gross national product (the dollar value of all the goods and services produced in our economy) rose in 1956. It will continue to increase in 1957—but more slowly. More of the rise will be in the form of higher prices, and less in the form of increased output of goods, than in 1956.

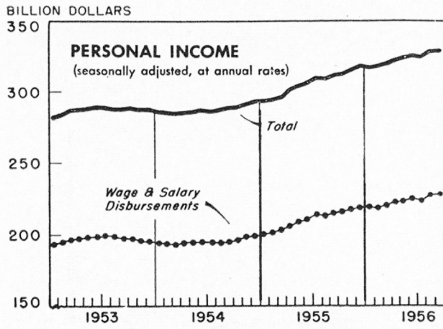
The number of people at work in this country in late 1956 was up 1½ million from a year earlier. Unemployment last fall was low. It amounted to about 3 percent of the labor force. This is below

coming next month - -

Family Living Outlook for 1957







the number usually shifting from one job to another. Personal income during the fall was up about 20 billion dollars over that of a year earlier. Retailers have been through a record holiday season. December's industrial production probably set a new record.

Consumer credit is up. But the rate of growth was less than in 1955 and not unduly high in relation to the amount of income people have.

The major push behind the business expansion is the investment in new factories and factory equipment. Businessmen plan to invest in new factories and factory equipment at a record rate in 1957. Construction activity during the past year held up. Housing construction was down. But business and public construction increased enough to offset that.

Demand from other sources has been growing too. Consumer buying has risen—spurred on by higher consumer incomes. And government spending has turned up. New roads, increased defense spending and the like have given a push here. Likewise, state and local governments will be spending more for roads and schools.

In the third quarter of 1956, the gross national product had reached a record rate of 414 billion dollars. That was 17 billion dollars or 4 percent more than a year ago. Nine billion dollars of this increase represented increased consumer demand for goods and services. Total demand for investment was up nearly 3 billion dollars—half of which was increased foreign investment. Smaller outlays for private homebuilding offset much of the gain in business demand for new factories and factory equipment. Government spending accounted for a rise of almost 5 billion dollars.

Consumer incomes probably will rise further in the coming year. This means that the demand for farm products is likely to be maintained at a high level in 1957. Expenditures for food will rise further as incomes increase. But the trend toward more services and higher charges for marketing and processing of recent years, plus more eating away from home, has offset much of the effect of rises in income on the demands for farm products.

Meanwhile, supplies of farm products continue abundant. Crop production in 1956 was about the same as in 1955. Output of livestock products was slightly larger. Stocks of corn are expected to increase during the coming year.

Costs and Income

Prices paid by farmers for commodities, interest, taxes and wage rates have risen since the beginning of 1956. In mid-October they averaged 2½ percent above a year earlier. With prices received also higher, the ratio of prices received to prices paid (the parity ratio) was 82 in October. This was the same as a year earlier.

The uptrend in prices paid by farmers for most industrial items is expected to continue in 1957. Interest and tax payments per acre and wage rates are also expected to increase.

Farm operators' net incomes turned up in 1956, following 4 years of decline. Current prospects point to some further increase in 1957—largely the result of the soil bank payments. Farm costs probably will be up enough in 1957 to offset any increase in income as a result of the expected slightly higher prices for many farm products.

Livestock

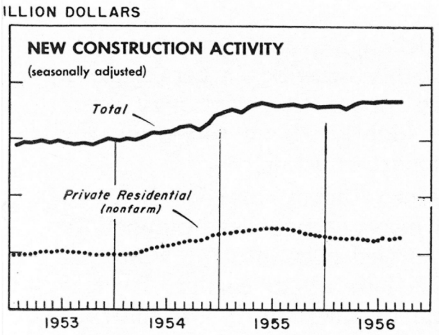
Livestock production will continue large in 1957. Hog slaughter will be off. But fully as many cattle are likely to be slaughtered as in 1956. Prices for *hogs* will be higher than last year. *Cattle* prices are expected to stay above their lowest points of 1956—but will average lower during the last half of 1957 than they did a year earlier. With little change in slaughter in prospect, *sheep* and *lamb* prices also are expected to average slightly higher in 1957.

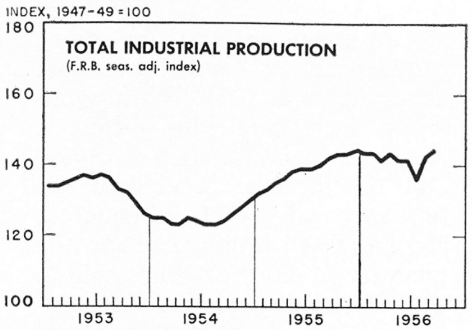
Hogs

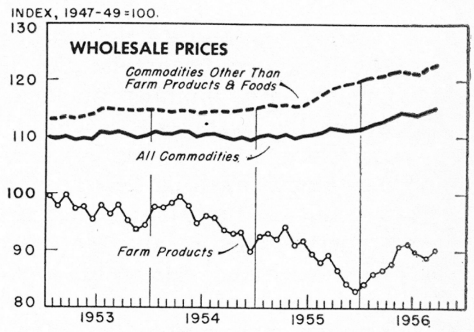
The 1956 spring pig crop was down 8 percent—with all of the reduction in late-farrowed pigs. Farmers were planning to reduce their fall farrowings about 7 percent. Thus, the reduction in slaughter began to show up in October.

The smaller pig crops will continue to be an influence during the first 8 months of 1957. In this period, hog slaughter will average considerably below 1956. And the prices of hogs, in turn, will be considerably better than in 1956.

The improved hog-corn ratio,





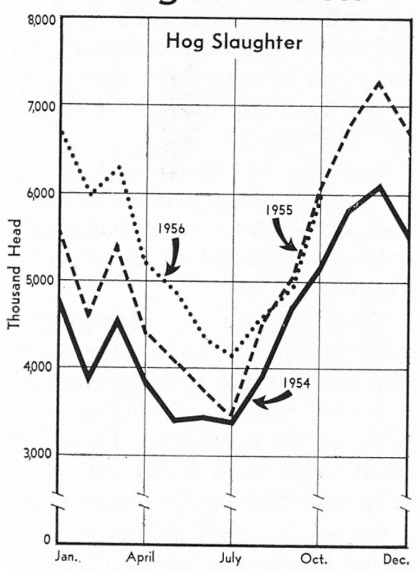


plus the smaller than usual decline in hog prices in the fall of 1956, has made producers more confident. And the second largest corn crop on record, plus "dollar corn" in a sizable part of the Corn Belt, has added to the incentive to increase farrowings.

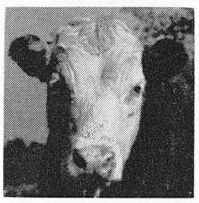
There's a strong possibility that by late spring, farrowings will be back to their 1956 level. Farrowings during the summer and fall of 1957 probably will be larger than those of 1956.

Thus, hog slaughter will continue below the level of a year earlier until the latter part of 1957. Thereafter, it will be a little larger.

Hog Situation



Hog prices should be above those of the past year during the first 10 months of 1957 at least. If the increase in the late-spring pig crop isn't excessive, the low in the hog market next fall probably won't be far from the low of this past fall. Our population will be increasing, and the supply of pork for the fall and early winter of 1957-58 shouldn't be excessive.



Cattle

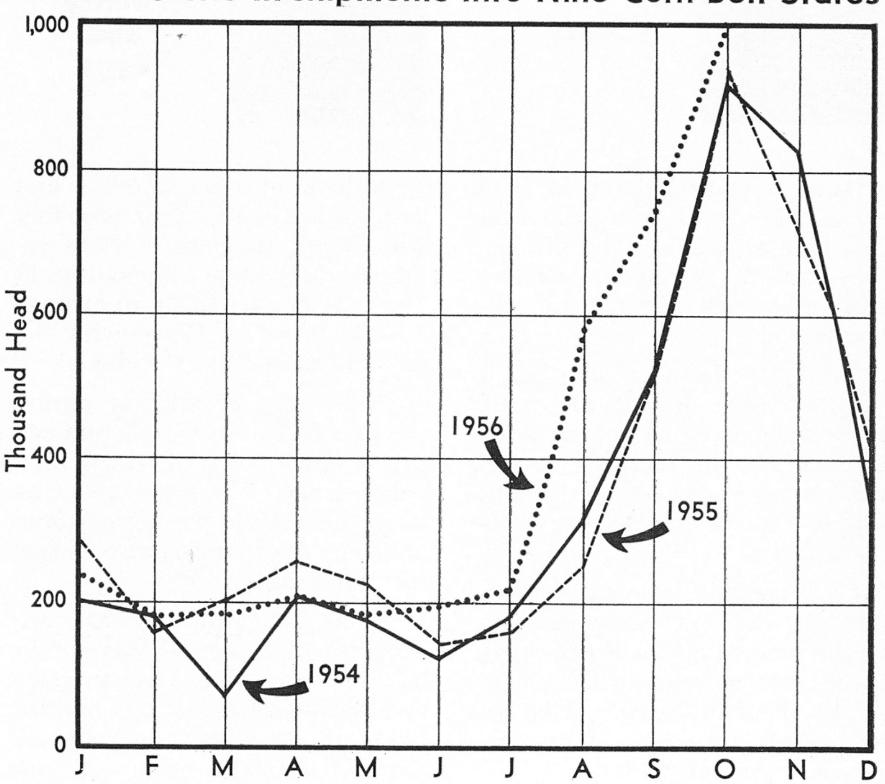
The total number of cattle slaughtered in 1956 was fully as large as the number produced, less death losses. So the Jan. 1, 1957, cattle inventory should be no larger than that of a year earlier and could possibly be down slightly.

However, the number of cows in the country won't be down any. And the number of young stock on farms will remain large —but with fewer in the West and more in the Corn Belt. And there will be fewer older steers and more calves than on last Jan. 1.

With this prospective inventory, cattle and calf slaughter probably will be larger in 1957 than in 1956. More cattle will be on feed during the winter season than a year earlier. Furthermore, 1957 cattle slaughter will contain more fed cattle than in 1956.

Prices of fed cattle will decline seasonally this winter but probably won't get quite as low as a year earlier. But a price rise next summer equal to that of this summer isn't likely; considerably more cattle are headed for the summer and fall market.

Feeder Cattle In-shipments Into Nine Corn Belt States



Many of these cattle will be in the hands of beginners. An unusually large number of feeders are in the business this winter in the Corn Belt. Typically, beginners don't finish cattle to as high a grade as the more experienced feeders. This is another reason for expecting relatively heavy marketings of cattle during the summer and early fall. And a fairly large percentage of these cattle should fall in the good to low-choice bracket. So there could easily be a larger than normal gap between the prices of cattle grading low-choice and average-choice or better next summer.

Peak in the fed cattle market next fall probably will come late. The heavy movement of fed cattle is likely to come early. If the weather is good in the grazing areas, there will be a tendency to hold back cattle in the ranching areas. This could result in a narrow spread between the price of feeder cattle and fat cattle next summer. This wouldn't encourage short feeding. So, late in the season (after most of the fed cattle have moved to market) could be the period for the seasonal rise in fat cattle next year.

Dairy

Total milk production in 1956 set a new record of a little over 127 billion pounds. The production on farms next year probably will be between 129 and 130 billion pounds.

Prices to farmers will be at about present levels, allowing for seasonal variation, at least through March. Thereafter prices will be influenced by the level of supports to be announced, effective April 1.

Cash receipts from dairy products in 1957 probably will increase moderately to a new high. Some costs, however, will be higher. So there probably will be little change from 1956 in the net returns from dairying.

Consumer demand for dairy products in 1957 will be at least as strong as in 1956. With population increasing, this means a larger civilian use than in 1956. But the increase in civilian use probably will be about equal to the increased production. So the quantity of dairy products sold to the Commodity Credit Corporation in the next 12 months should be about equal the 5 billion pounds sold in 1956.

Sheep and Lambs

Sheep and lambs, like cattle, are relatively stable in number. Expansion in the East is offset by reduction in parts of the West. Producers in 1957 will receive a substantial incentive payment on their wool as they did in 1956. This helps to increase the returns to the sheep enterprise. A good, well-managed native sheep flock will continue to be a paying proposition on Iowa farms.

Poultry and Eggs

Outlook of eggs, broilers and turkeys in the new year probably will exceed the record levels established for these commodities in 1956. Prices are likely to average a little lower in 1957—with the possible exception of broilers.

Larger egg production during the first half of 1957 will pull egg prices down below the level of a year earlier. There are about as many hens laying as a year ago, and they're producing at a higher rate per bird.

About as many chickens are expected to be raised this spring as in 1956. Thus, egg supplies and prices in the fall of 1957 are likely to be about the same as those of last fall.

Although broiler output in 1957 probably will be larger than in 1956, prices this year may average slightly above those for the last part of 1956.

More turkey breeder hens of the heavy types were planned to be carried over into the winter of 1957 than a year earlier. Even if some of these birds are sold, intentions indicate a larger supply of hatching eggs and of poults in 1957 than in 1956.

Feeds

The total feed supply for the coming year is slightly above that of a year ago. The record corn supply for 1956-57 of over 4½ billion bushels overshadows the whole feed picture. This is one-sixth larger than the 1950-54 average. The 1956 crop of 3.4 billion bushels probably will outrun our requirements by around 250 million bushels. Thus, there will be a further increase in the carryover of corn from the record of nearly 1.2 billion bushels this past October.

Supplies of other feed grains are smaller, and carryover of these is expected to be somewhat smaller than at the end of the previous season.

Total supply of high-protein feeds is expected to be about 5 to 10 percent larger than a year ago. A record output of soybean oilmeal is in prospect. This will much more than offset the moderate reduction in cottonseed meal.

Prices of small grains are expected to average higher this winter and next spring than a year earlier—the result of the smaller output and higher supports for oats, barley and grain sorghums. The seasonal advance in corn prices, however, isn't expected to be as large as that of a year ago.

And if the 1957 growing season is favorable, feed prices generally will average a little lower next summer than in the same period of 1956, because of the lower support prices on corn.

Recommended Crop Varieties for 1957

Using improved crop varieties is one of the best ways of getting the most for your money. Here are the crop varieties recommended for 1957. Each is backed by long and painstaking experiments and research.

by I. J. Johnson and W. H. Bragonier

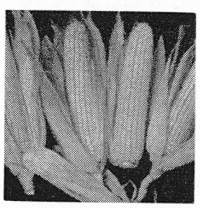
EVERY YEAR at this time, new crop varieties are recommended for Iowa, or recommendations of earlier years are confirmed. These recommendations are based on extensive yield trials grown for a number of years in many parts of the state. This is also the time when many farmers start making definite plans for specific crop varieties to be grown this year. Your choice can play an important part in the success of your farm business in 1957.

Extensive trials with grain and forage crops show wide differences in performance among the many varieties now available. We believe it unwise to choose a variety on the basis of only 1 or 2 years of tests. Many new varieties can't safely be recommended until they've been widely tested for several years in different areas of the state. This way we can be more certain of their performance under varying conditions. Complete reports of the variety trials for different crops are available from your county extension director or from the Publications Distribution Room, Iowa State College.

The crop varieties listed as recommended are eligible for production as certified seed. Many growers in your community as well as seed companies have certified seed for sale. You can obtain a list of seed growers from your county extension office.

In addition to choosing the best varieties to meet your needs, it's important to be sure you have high-quality seed. It pays to examine the seed you buy carefully to see that it's properly labeled, that it has high purity and germination and is free from noxious and other weed seeds. There are many seed dealers in Iowa who handle high-quality seed.

Though the use of good seed of recommended crop varieties is an important part of good farming—and adds little to cost—use of recommended varieties alone may not produce top yields. Other recommended crop and soil management practices should be followed, too. A combination of good practices works better than any one alone.



Corn

A large number of corn hybrids are available from seed companies and farmer-seedsmen. We can't list hybrids from all of the commercial companies here. Consult the 1956 Iowa Corn Yield Test bulletin for specific data on all hybrids entered in the 1956 Iowa Corn Yield Test. This bulletin will be available about mid-February. Farmer experiences and results from trials have shown that most hybrids sold under private pedigrees are well adapted and give excellent performance in Iowa. Sales representatives can

I. J. JOHNSON is professor in charge of farm crops, Department of Agronomy. W. H. BRAGONIER is professor and head of the Department of Botany and Plant Pathology.

The recommendations made in this article have been jointly prepared by the project leaders in agronomy (farm crops) and in botany and plant pathology. These recommendations have been reviewed by members of the Iowa Seed Council, including representatives from the Iowa Seed Dealers Association, the Iowa Crop Improvement Association and the Iowa Department of Agriculture.

give you information on their new and improved hybrids.

The hybrids listed below are those developed in the cooperative corn improvement program conducted by the Iowa Agricultural Experiment Station and the USDA. They have met the certification standards of the Iowa Crop Improvement Association.

Hybrids listed in the five general areas of the state are "full-season" in adaptation. Earlier hybrids should be used for late planting or for assurance of dry corn for earlier harvest to meet feeding needs. Occasionally the hybrids listed may be successfully grown farther north than the areas recommended, but the chances of frost damage become greater.

Dent Corn

Hybrids for northern Iowa:

Iowa hybrids 4417, 4470, 4483, 4542 and 4630.

Hybrids for north-central Iowa:

Iowa hybrids 4249, 4297, 4298, 4316, 4376, 4397, 4412, 4470, 4570 and 4575.

Hybrids for central Iowa:

Iowa hybrids 4376, 4517 and 4576.

Hybrids for south-central Iowa:

Iowa hybrids 4439, 4517, 4622; Ohio C-92; U. S. 13.

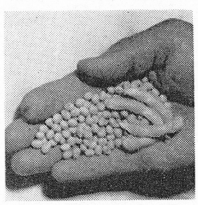
Hybrids for southern Iowa:

Iowa hybrids 4449, 4513, 4565; AES 801 and 806; Ohio C-92; U. S. 13.

Popcorn

Yellow—Iopop 6, 8 and P-32, P-202.

White—Iopop 5 and 7.



Soybeans

It's important to choose a variety of soybeans that uses the full growing season but reaches maturity before a killing frost. The varieties listed below do this when planted at the normal dates in the areas indicated.

Soybeans are often used to replace crops lost through flooding, hail or other reasons. If this need arises, early maturing varieties for your area may be planted at later than normal dates and still produce a fair crop. Write to the Agronomy Department at Iowa State College for special recommendations.

Northern Iowa:

Chippewa—A new, high-yielding variety which is about 1 week earlier in maturity than Blackhawk but compares favorably with it in all other characteristics. In comparison with Mandarin (Ottawa), Chippewa yields about 5 bushels higher, is 3 to 4 days later in maturity, 6 inches taller and 1 percent higher in oil content. Chippewa is expected to replace other varieties of similar maturity.

Blackhawk—Early, medium-tall lodging resistant and high in oil and yield.

Hawkeye—For western and southernmost counties of northern Iowa. High yield, tall and lodging resistant.

North-central Iowa:

Hawkeye—Most widely grown variety in the northern half of the state.

South-central Iowa:

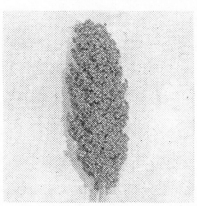
Adams — Popular variety with high yield, tall; more lodging resistant and a few days earlier than Lincoln.

Lincoln—High yield; tall; may lodge somewhat when growth is heavy.

Southern Iowa:

Adams and *Lincoln.*

Clark—A high-yielding variety. About 1 week later than Lincoln, and 3 to 4 bushels higher in yield; stands well.



Sorghums

There has been considerable interest in sorghums for grain production in Iowa during the past few years. Sorghum seed is similar to shelled corn in feeding value. Grain sorghum yields are relatively better than corn under drouth and high-temperature conditions. But grain sorghum yields may be lower than corn yields when rainfall is adequate for good corn production. From trials to compare sorghum varieties and hybrids the following varieties are considered *acceptable:*

Sorghums for Grain:

Martin, Midland and *Redbine 60*—For late May and early June planting in central and southern Iowa. Red-seeded and similar in height and maturity. Satisfactory in seed yield and quality.

Combine Kafir 60—White-seeded but similar to above varieties in maturity when planted at the same date. Yields well under favorable conditions, but grain quality may be adversely affected by unfavorable fall weather.

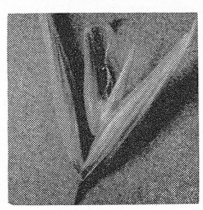
Norghum and *Reliance*—Early, red-seeded varieties, satisfactory in yield. For early planting (late May and early June) in northern Iowa and late planting (last half of June) in southern Iowa.

Hybrid grain sorghum — Several hybrids will be available in small quantities. Some have been tested 1 year; some not at all. A number yield better and a few no better than the best other varieties; certain ones lodge badly under very dry conditions. Small acreages of several hybrids compared with a recommended variety would be a better choice than planting a large acreage with an unproven hybrid.

Sorghums for Forage and Silage:

Norkan, Axtell, Rox Orange and *Waconia Orange*—Good yielding, palatable types for early planting (late May) in northern Iowa and late planting (late June) in central and southern Iowa.

Atlas—High-yielding, tall, lodging-resistant, late variety for early planting in central and southern Iowa.



Small Grains

Oat Varieties

The 1956 growing season was the most unfavorable for oats in

many years. Northeastern Iowa, where rainfall was adequate, was an exception. Oats headed earlier than normal, and the period from heading until ripening was very dry and hot. Usually, 30 days are required for grain filling. But in 1956, the grain ripened in 20 days in most counties. The result was poorly filled kernels, light test weights and poor yields. Fortunately, the 1956 growing season also was unfavorable for oat diseases. Crown and stem rust and Septoria disease were present in only trace amounts and caused little damage.

None of the available oat varieties is entirely satisfactory in all respects—including resistance to all diseases. A common practice on farms with a large oat acreage is to plant two or three varieties. This spreads the date of harvest and reduces the risk of loss from any one disease.

The following oat varieties are recommended for growing in 1957. They are listed in alphabetical order in each maturity group.

Early Maturing:

Bonham—A pink, plump-kerneled variety; has the highest yield of the three early varieties in Iowa trials; also weighs about 1 pound more per bushel. Susceptible to race 7 of stem rust, crown rust and Septoria disease but resistant to race 8 of stem rust.

Cherokee—Very similar to Bonham in disease resistance and plant characteristics; has the lowest yield record of the three early varieties during the last 4-year period.

Nemaha — Similar to Cherokee and Bonham in plant characteristics and disease resistance. Has yielded 1 to 4 bushels per acre more than Cherokee.

Midseason Maturing:

Clarion—A new variety which produces strong straw and high testweight grain. Has yielded relatively higher in southern Iowa than in northern Iowa. Resistant to race 7 of stem rust, moderately resistant to prevalent races of crown rust; susceptible to Septoria disease and to race 8 of stem rust.

Clintland — Essentially Clinton with added resistance to race 202 of crown rust. It is susceptible to race 7 but resistant to race 8 of stem rust and to Septoria disease. Clintland has yellow, medium-sized kernels and stiff straw.

Mo. O-205—One of the outstanding varieties in the yield trials and adapted to all areas of the state. Has moderate straw strength and small grey-colored kernels with a low hull percentage. However, its small kernel size makes this variety undesirable for commercial milling. Resistant to race 7 but susceptible to race 8 of stem rust. Resistant to race 202 of crown rust and to Septoria disease.

Late Maturing:

Sauk—A medium stiff-strawed, high-yielding variety. Test weight varies from medium to light. Resistant to race 7 of stem rust and Septoria disease; moderately resistant to crown rust but susceptible to race 8 of stem rust.

Barley Varieties

Most barley produced in Iowa is used as feed for livestock. Some varieties may bring premium prices as malting barley if care is taken in production and harvesting. Two varieties are recommended for 1957.

Kindred (malting type)—Also called "L" barley; has plump white grain desired for malting; good yielding, six-rowed, rough-awned, medium-maturing, weak-strawed. Resistant to stem rust and moderately resistant to bacterial blight and the root rots; susceptible to leaf rust, mildew, smut, scab, stripe and some strains of spot blotch.

Plains (feed type)—Has large white grain, is high yielding, six-rowed, smooth-awned, early maturing, short, stiff-strawed. Resistant to stem rust and drouth; susceptible to loose smut, leaf rust, spot blotch and bacterial blight.

Flax Varieties

Flax, like barley, is grown largely in the northwestern sections of the state. Flax is a good companion crop for forage seedings when weeds aren't a serious problem. Midseason-maturing varieties have given most consistent yields in Iowa.

Marine—Early-maturing variety that has yielded well. Resistant to wilt and rust; most tolerant to pasmo of commercial varieties available.

Redwood — High-yielding variety of midseason maturity, resistant to all prevalent races of rust, moderately wilt resistant, susceptible to pasmo.

Wheat Varieties

Winter wheat generally outyields spring-sown varieties and has given the most consistent performance in southern and southwestern sections and along the Missouri River bottomlands.

Winter Wheat Varieties:

Comanche—Moderately high yielding, bearded, early-maturing with short, medium-stiff straw. Somewhat lacking in winterhardiness and recommended only for southern Iowa. Resistant to stem rust (except race 15-B) but susceptible to leaf rust and loose smut.

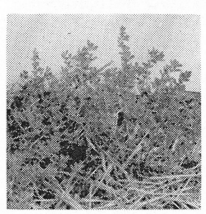
Iowin—High yielding, bearded, medium-late maturity, tall, weak straw with tendency to lodge on very fertile soils; recommended primarily for the upland or lighter soils of southern and central Iowa; has good resistance to leaf rust.

Minter—High yielding, bearded, mid-late maturity, medium-tall, weak-strawed. Good winterhardiness, especially recommended for central and northern areas of the state.

Pawnee — Moderately high yielding, bearded, early maturing, stiff-strawed, short; somewhat lacking in winterhardiness; recommended primarily for southern areas of state.

Spring-Sown Varieties:

Henry, Lee, Rushmore and Selkirk—High yielding and stand well. *Henry* has been the top yielder but produces a poor-quality flour and is recommended only for feed. *Lee* has the best resistance to leaf rust. *Rushmore,* an early-maturing beardless variety, appears well-suited for sowing in oat-wheat mixtures when grown with an oat variety of similar maturity. *Selkirk* has moderate resistance to race 15-B of stem rust.



Forage Crops

New varieties of forage crops are becoming more widely grown

by Iowa farmers. Experimental trials have shown that some of these have considerable superiority over older varieties. Certified seed is recommended because it assures you of genetic purity and freedom from noxious weeds.

Alfalfa Varieties

Large quantities of high-quality alfalfa seed are produced in the western states under irrigation. Certified seed of recommended varieties produced in any area from foundation stocks maintained in the area of adaptation is entirely satisfactory for Iowa farmers.

Vernal—A new winterhardy variety resistant to bacterial wilt. Performance tests have shown Vernal to be outstanding in forage production. Adapted for all parts of the state.

Ranger—The most widely grown bacterial wilt-resistant variety. Winterhardy, yields well and recommended for all parts of Iowa.

Buffalo — Bacterial wilt-resistant and slightly superior to Ranger in central and southern Iowa. Not recommended for northern Iowa.

Ladak, Atlantic, Narragansett, Cossack, Grimm and *Northern Common*—Produce satisfactory yields for short-term stands. Varieties with a high degree of wilt resistance are preferred, however, if the stand is to be left for 3 or more years.

Red Clover Varieties

Seed from known origin in the Corn Belt or similar latitudes in the United States and Canada is adapted to Iowa conditions. English and other European red clovers are *not* recommended. Here are those which are:

Common—Seed from known origin in the Corn Belt and similar latitudes.

Kenland—A new variety resistant to southern anthracnose. Forage yields averaged as high as for any variety. Seed supply now adequate.

Midland—High-yielding, well-adapted originating from Corn Belt strains.

Dollard—A Canadian variety resistant to northern anthracnose. Best adapted in northern Iowa. Seed supply is limited.

LaSalle—A Canadian variety similar in adaptation to Dollard.

Sweetclover Varieties

For many years sweetclover has been the leading crop for legume green manure in seedings with oats or other grains. Stands should be plowed down either in late fall or in the spring in time for corn planting. Watch for weevil damage; weevil resistant varieties are not available.

Hubam—Annual white. Not as high in yields of nitrogen and organic matter as biennial types but may be plowed in the fall without danger of volunteer growth the following year.

Madrid — Biennial yellow. Produces excellent yields of nitrogen and organic matter in the first-year growth.

Ladino Clover

Ladino clover is a larger and much more productive variety than common white clover. Ladino is recommended in rotation pasture and in meadow mixtures except where moisture may be a limiting factor. It's also valuable for green manure when seeded with oats in mixtures with other legumes such as red clover, alfalfa and sweetclover. Seed prices are relatively lower than for other legumes because the seeds are very small. Adding ½ to 1 pound of seed in legume mixtures gives a good stand of Ladino.

Birdsfoot Trefoil

Birdsfoot trefoil is a deep-rooted, winterhardy perennial legume for use in permanent and long-rotation pastures. It's adapted to a wide range of soil conditions, but establishment often is slow. Birdsfoot trefoil grows well in mixtures with Kentucky bluegrass and orchardgrass.

Empire—Semi-prostrate growth habit; recommended for pasture use. Seed produced in Iowa or Minnesota from New York Empire is equal in performance to that produced in the eastern states.

European — Imported broadleaf, upright types, not as winterhardy as Empire and must be managed carefully to persist under grazing.

Cascade, Granger, Mansfield, Parker and Viking — Varieties of the upright type developed by selection from European. These varieties are superior to Empire in hay yields. Seed supplies are limited.

Lespedeza

Korean lespedeza is useful for improving pastures in southern Iowa — especially soils that are too steep to be plowed.

Iowa 6—An early, wilt-resistant selection that produces high yields of forage and seed. Stands are maintained by profuse self-reseeding year after year.

Bromegrass

Bromegrass is a widely adapted, hardy grass for good soils. It does best when grown with a legume, especially alfalfa. But stands depleted of legumes can be stepped up considerably in seed and forage production by applying nitrogen fertilizer (60 to 80 pounds of nitrogen per acre).

Recommended varieties — all similar in performance—are:

Fischer, Lincoln and *Achenbach* — Widely grown southern types, approximately equal in performance; tall, leafy and good seed producers under proper management.

Southland—A new variety similar in performance to the southern types.

Sudangrass

Because of its rapid, vigorous growth in hot, dry weather, sudangrass does well for summer pastures. It also has value as an emergency pasture or hay crop in adverse seasons.

Piper—Early, rapid in growth and recovery; disease resistant and high in yield; low in prussic acid content.

Greenleaf—A new variety from Kansas. Late, leafy and disease resistant with juicy stems and sweet forage. Satisfactory in yield.

Soil Moisture Situation 1957

Your "bank account" of soil moisture can't be "overdrawn"—nature won't advance the funds. Your account for 1957 crops depends on the current balance plus any amount of moisture added, absorbed and held.

by Gerald L. Barger and Robert H. Shaw

THE TERM "soil bank" has a very real meaning when we think about the 1957 corn crop. We can't "overdraw" our soil moisture account — nature just won't advance funds. But our balance can be reduced to near zero during dry seasons such as 1956.

What We Have . . .

Better Iowa soils have a capacity of 8 to 12 inches of water available to plants in the top 5 feet. On Nov. 1, 1956, according to 20 locations sampled, available soil moisture varied from less than 25 percent to more than 50 percent of capacity. The western and southern three-fifths of the state was at 25 percent of capacity or less, as shown in map 1. In northeastern Iowa, the water stored was 25 to 50 percent of capacity. In some east-central counties 50 percent or more was available on Nov. 1.

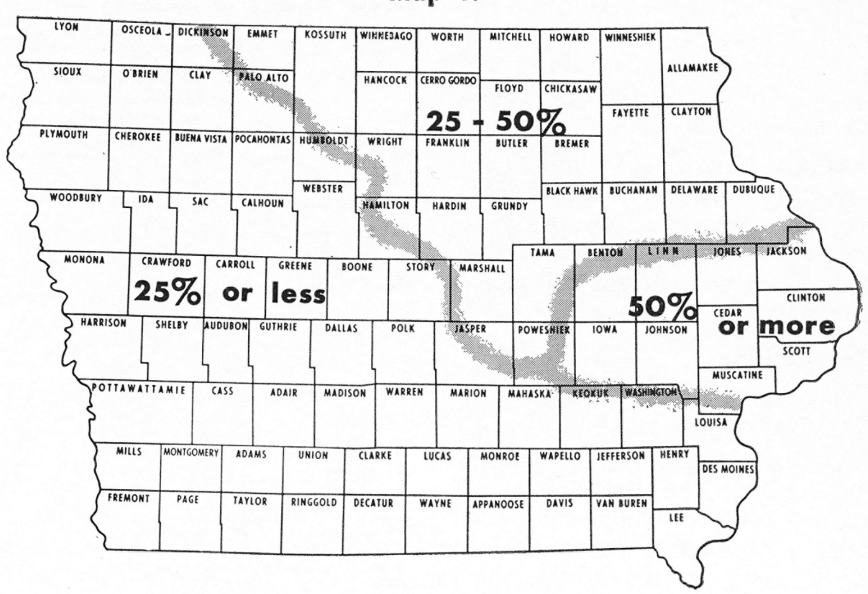
We believe 50 percent of capacity is somewhere near normal for Iowa at the time of the fall samplings.

The dividing zones as drawn in map 1 are used only to mark off general areas of soil moisture. We don't have the data to locate these zones exactly. In general, however, we can say that on Nov. 1, there was something like 2 to 6 inches of available water in the surface 5 feet of soil for the start of our 1957 account.

What Can We Get?

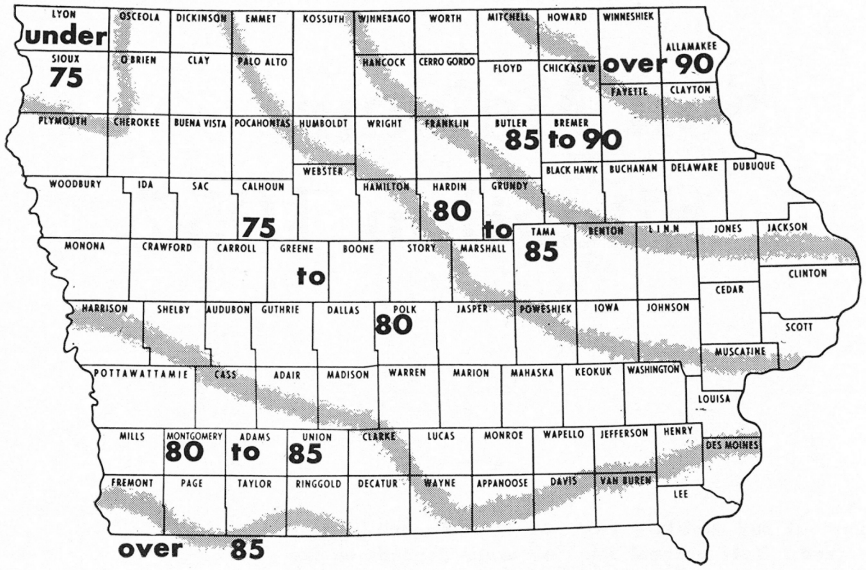
Now what can we expect from the sky? Normal total rainfall in Iowa for the period, Nov. 1 through April 30, is about 7 to 9 inches. But there's appreciable evaporation in November and April and also smaller losses throughout the winter. Couple this with the fact that frozen soil doesn't absorb water rapidly, and you can see why we can't expect too much of an increase in soil

Map 1.



GERALD L. BARGER is associate professor of agricultural climatology and area climatologist, U. S. Department of Commerce. ROBERT H. SHAW is associate professor in charge of agricultural climatology.

Map 2.



moisture from winter precipitation.

In the last year or two, for example, near-normal winter precipitation hasn't changed the previous fall's soil moisture picture much by corn planting time. In other words, we still have to depend on late spring and summer rainfall as a supplement to the water already stored in the soil last November.

Now look at map 2. Under usual soil moisture conditions in the spring, 11 inches of rainfall between May 17 and September 5 is just barely enough to support an average corn crop in Iowa. This is an average minimum supply, not an optimum or ideal amount for top yields. The odds of getting 11 inches or more range from 75 chances in 100 in the extreme northwest—to 85 in 100 in the southwest—and 90 times out of 100 in the northeast. These are high probabilities.

But in May of 1957, unless we have better than normal fall, winter and spring moisture, many of you will need more than 11 inches because of the current soil-moisture deficit.

The Odds . . .

The table lists 13 counties in Iowa for which rainfall records have been studied in relation with corn yields. The first column of figures indicates the usual minimum rainfall requirements during the growing season. Notice that these amounts range from about 8 inches up to nearly 13—depending on the soil and location involved. In column 2 you see the chances of receiving these amounts. They range from 62 chances in 100 (i.e., 62 percent) in Crawford County to 92 chances in 100 (92 percent) in Linn County. The other four columns in the table give you the odds of receiving the amount of rainfall in the first column *plus* an *additional* 2, 4, 6 and 8 inches, respectively.

Say your soil is 4 inches below the usual storage amount in May and you live in Hamilton County. Ordinarily you'd need 10.4 inches of rainfall. But with a 4-inch deficit, you need about 14.4 inches. The chances of receiving this amount between mid-May and early September are 37 percent, or 37 years out of 100 you could expect to get more than 14.4 inches of rainfall.

These are the odds right now on your getting an average corn yield next summer *if* you have a 4-inch soil moisture deficit at planting time. If you're only 2 inches below the usual supply, your chances would be 56 percent. But if you need an extra 6 or 8 inches, the odds drop to 20 percent and 11 percent, respectively, and these are poor risks indeed.

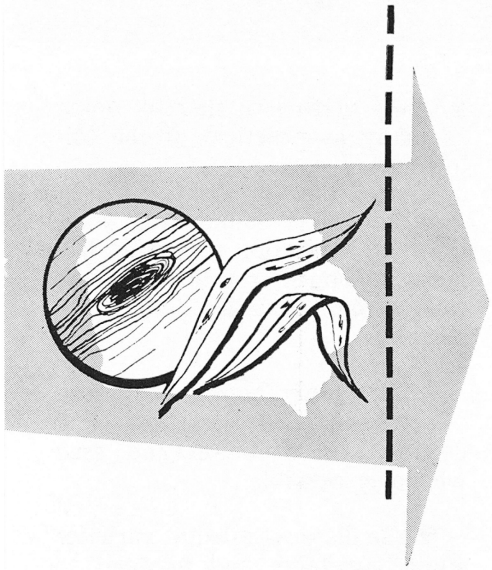
In 1956 several places in southwestern and south-central Iowa did need 4 to 8 inches of additional rainfall during midsummer to produce an average crop. Fortunately many of these places received excesses sufficient to make up at least a good portion of this deficit. This could happen again in 1957.

We are confident, however, that it won't happen in more than 3 to 6 years out of 10 and—more certainly—not more than in 30 to 60 years out of 100. The longer the period of time, the more reliable are the probability figures which we've given you. For any one year, they may turn out wrong. Over the long pull, however, and if you make your plans according to the chances outlined in the table, you should be money ahead. We'll have more up-to-date soil moisture information for you as planting time approaches.

Percent Chance of Receiving Varying Amounts of Total Rainfall During the 16 Weeks, May 17 through Sept. 5.

County	Minimum rainfall requirement with normal soil moisture storage[a]	Chances of receiving the following: Minimum requirement only	Minimum plus: 2"	4"	6"	8"
Lyon	8.2	87%	74%	54%	36%	21%
Cerro Gordo	12.3	72	53	36	19	11
Fayette	12.8	68	47	29	17	9
Crawford	12.0	62	43	27	17	8
Hamilton	10.4	76	56	37	20	11
Story	8.6	90	76	59	43	31
Marshall	9.1	89	75	58	41	27
Linn	8.9	92	77	58	37	22
Page	9.3	90	79	64	48	33
Ringgold	10.9	83	69	53	38	27
Wayne	12.4	64	47	35	23	16
Washington	8.9	87	73	58	43	29
Jefferson	12.2	67	52	38	26	18

[a]These values are based on 50 years of rainfall records and county average corn yields (adjusted to hybrid corn levels) taking soil moisture as it happened to occur each year. Usually each amount is barely sufficient to produce an average corn crop in the county shown. Dry subsoil requires larger amounts of seasonal rainfall.



Plant Disease Outlook for 1957

Plant diseases have damaged our crops just about as long as crops have been grown. It's not likely that 1957 will be an exception. How badly they'll damage this year's crops depends a lot on the weather coming up.

by Malcolm C. Shurtleff

PLANT diseases are now controlled largely by scientifically bred resistant varieties, carefully grown seed stocks and carefully timed applications of preventative fungicides. This control is only 50-percent effective. If everyone practiced the best known methods of control, current losses could be reduced about 25 percent. The remaining 25-percent disease loss calls for new methods, new chemicals, new equipment and better cultural practices.

In the future, we can expect revolutionary new chemicals to control root rot, nematodes, viruses and internal types of parasites which aren't effectively controlled now.

Importance Varies . . .

Plant diseases reduce the vigor, yield and quality of the plants themselves as well as the seeds and fruits they produce. Field crops, vegetables, fruits, flowers, shrubs and shade trees—in fact all plants—have disease enemies that vary in seriousness and importance from year to year.

Plant diseases are greatly influenced by the weather. How severe plant diseases will be in 1957 depends largely on the amount and frequency of rainfall this coming spring and summer. In cool, wet years, diseases are generally much more important than in warm, dry seasons. But some loss occurs every year.

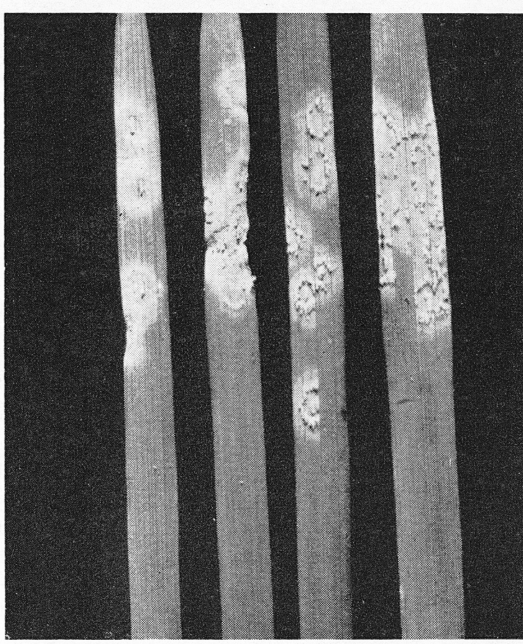
Many diseases are unrecognized and overlooked because their damage isn't great enough to alarm growers. Unless a loss is striking, such things as the weather, poor seed, conditions of the seedbed, depth of planting, poor fertility, etc., get blamed when, actually, one or more plant diseases may be the real culprit.

Sustained losses for several reasons may drive a crop from one area to another less favorable for the disease. Examples here in Iowa are: barley scab, watermelon wilt, soil rot of sweet potatoes and fire blight of pears and apples.

From careful study of records and field observations, plant pathologists can predict future outbreaks of disease—though not always the seriousness. Long-range weather forecasting, 30 days in advance, is helping in this respect. The table gives you some idea of the prospects in 1957—depending on the weather—for outbreaks of our most common Iowa plant diseases.

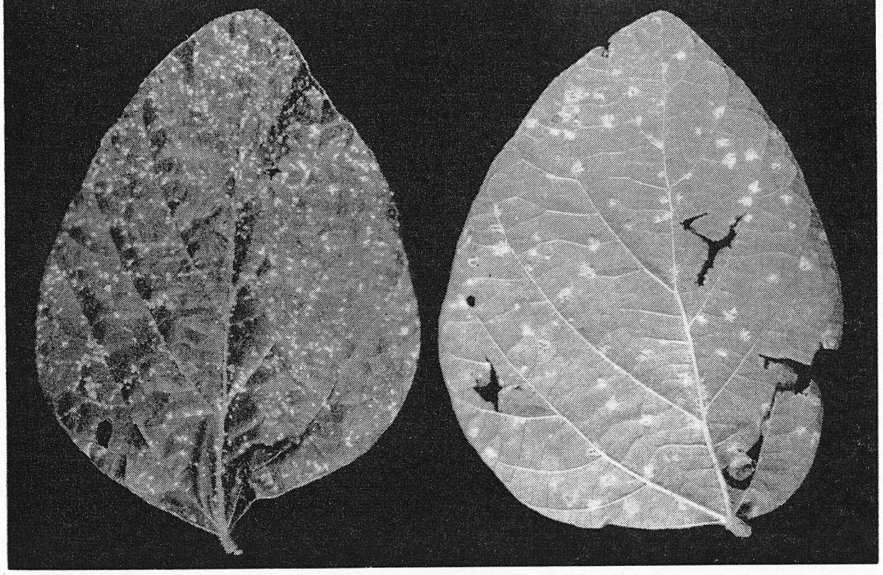
What You Can Do . . .

Though exact predictions of disease outbreaks are difficult, you can keep losses at a minimum re-

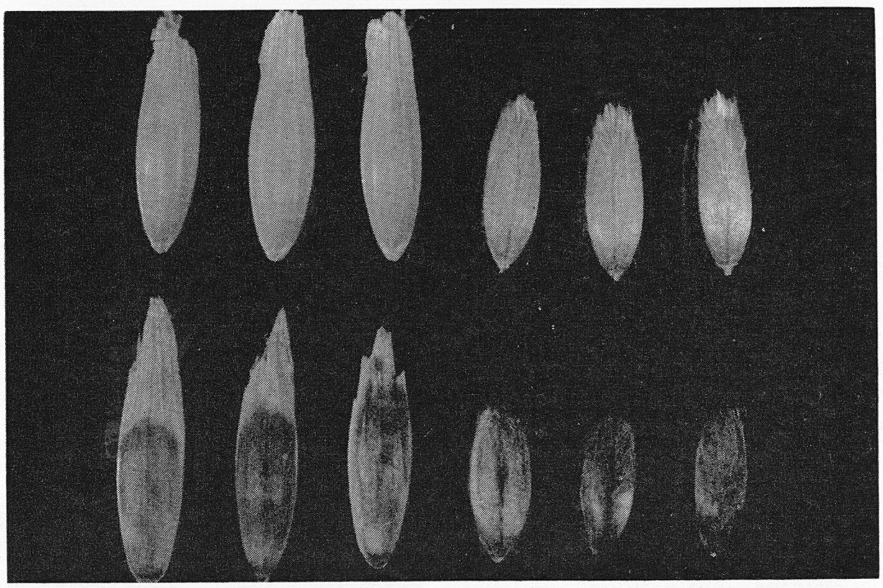


Greatest trouble from oat crown rusts can be expected under wet spring or summer conditions. Serious trouble is unlikely in relatively dry seasons.

MALCOLM C. SHURTLEFF is assistant professor of plant pathology.



ABOVE: Downy mildew of soybeans; upper leaf surface (left) and lower leaf surface (right). BELOW: Septoria disease of oats; healthy kernels at top, infected kernels at bottom. See table for prospects of oat and soybean diseases depending on weather.

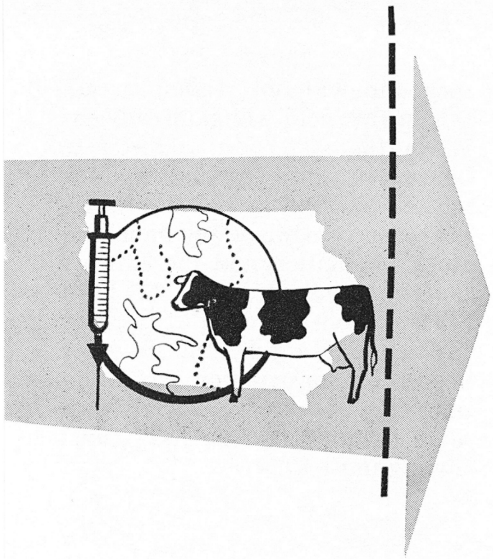


gardless of the weather by doing as many as practical of the following:

- Practice a sound crop rotation and sanitation program. Remove and burn crop debris in the fall or plow it under deeply and cleanly.
- Plant only high-quality seed of recommended varieties. Use certified or disease-free seed whenever possible.
- Use disease-resistant varieties where available and adapted to Iowa. Use more than one variety.
- Clean and chemically treat seed of cereals, grasses, vegetables and flowers.
- Plant as early as practical in a well-prepared seedbed. Carry out recommended cultural practices.
- Avoid mechanical injury when cultivating, harvesting, etc.
- Use *protective* fungicide sprays or dusts (preferably applied just before wet periods) on fruits, vegetables and ornamentals which have had disease in the past. Apply materials often enough, at the right time and thoroughly.
- Keep down weeds and insects which may harbor disease-producing organisms.

Prospects for Some Common Plant Diseases in 1957, Depending on the Amount of Rainfall During Spring and Summer.

Crop	Disease	Wet spring and/or summer	Normal spring and/or summer	Dry spring and/or summer
Field crops, vegetables, flowers	Stem and root rots, leaf spots and blights, seed rot, damping-off	*Heavy*	Light to moderate	Trouble doubtful
Oats	Rusts, Septoria	*Heavy*	Light to heavy	Trouble doubtful
Wheat, barley	Rusts, scab	*Heavy*	Light to heavy	Trouble doubtful
Corn	Leaf blight	Moderate	Light	Trouble doubtful
Soybeans	Foliage diseases	*Heavy*	Light	Trouble doubtful
Potatoes, tomatoes	Blights	*Heavy*	Light	Trouble doubtful
Vine crops	Leaf spots, blights	Moderate	Light	Trouble doubtful
Apples, pears	Scab, fire blight	*Heavy*	Moderate to heavy	Light to moderate
Grapes	Black rot, downy mildew	*Heavy*	Light to heavy	Light
Strawberries	Foliage diseases, root rot	*Heavy*	Light to moderate	Light
Raspberries	Anthracnose, cane blight	*Heavy*	Light to moderate	Light
Trees, shrubs	Leaf spots, blights	*Heavy*	Light to moderate	Trouble doubtful
Evergreens	Browning, needle drop	Doubtful	Light	Moderate to heavy



Livestock Disease Outlook -- 1957

We're better prepared than ever before to cope with livestock diseases in Iowa. But there are still specific problems and room for improvement. Here are some of the things to think about and watch for in 1957.

by John B. Herrick

NO NEW diseases of great economic importance were diagnosed in Iowa last year. But others continue to take their toll. Millions of potential livestock dollars are still lost annually—because of failure to prevent outbreaks or failure to give prompt attention when they do break out.

Control of all livestock can't be obtained easily through using feed additives or certain blood lines. Veterinary science is rapidly developing and putting forth new ideas, new medicants, new concepts and cures every day. But there isn't yet an adequate substitute for strict sanitation and careful management.

Specifically . . .

Thousands of hogs weren't vaccinated for *cholera* in 1956, and many died as the result of outbreaks of this disease in several areas. Attempting to save money by not vaccinating for hog cholera seems to be a false economy. The modified live hog cholera vaccines are doing a satisfactory job in protecting hogs from this disease.

Brucellosis is still a problem in Iowa. Effective solution may depend as much upon legislative measures as upon individual on-farm and veterinary measures.

Mastitis control is receiving new importance from several aspects. Sale of milk from mastitis treated quarters containing high amounts of antibiotics, for example, is receiving attention in many milk markets.

Rabies is on the increase. Watch the wild fur-bearing animals as well as pets. Vaccinate all pets. Rabies is *not* a seasonal disease.

Poultry diseases are still largely neglected by flock owners. Over 200 veterinarians have completed intensified short courses to enable them to offer accurate diagnosis for poultry owners.

Leptospirosis is prevalent in the state. Watch for signs of this disease in your herd! Your veterinarian will aid you in diagnosing it.

Beware of . . .

—Substituting medicated feeds for good management. Various medicants in the feed simply can't solve all disease problems or effectively cover up poor management practices. A growing trend in this substitution has been noted, but it's *risky*.

—Buying diseased breeding stock. When you buy boars or gilts think of brucellosis, leptospirosis, bloody scours and rhinitis. These are the most serious of the several that can be spread through breeding stock. In buying bulls, consider vibriosis, leptospirosis, brucellosis and trichomoniasis. Exercise similar precautions in buying breeding stock for other livestock and poultry enterprises.

—"Easy cures" for sale to cure or control rhinitis in swine and other diseases where research has revealed and recommended different approaches for their control.

—External and internal parasites. Though they can rob you of many dollars, most are easily and inexpensively controlled.

Sources of Help . . .

Unfortunately, all possibilities for disease control and prevention can't be put on an individual on-the-farm basis. Some, to be effective, must be on a broader base. If we're sincerely interested in making Iowa a genuinely safe place to raise livestock, here are some of the broader possibilities for aids in that goal:

—Sound legislation to help control the spread of diseases.

—Establishment of an animal morbidity and reporting system in the state. Iowa doesn't have such a system, though over half the states—with lesser individual livestock populations—do.

—Use of veterinary services by all livestock producers—not just to treat sick animals, but to prevent the occurance of disease. To protect your animals, you have an indirect but vital stake in the protection of your neighbors' livestock.

Self-Help . . .

Iowa's livestock production has reached a high tempo—200-pound hogs at 5 months, more 500-pound butterfat herds, larger poultry flocks, better than 2 pounds-a-day gains for beef cattle, etc. These place a terrific strain on our livestock; we call them "stress" factors. Competition for feed, water and shelter is heavy in the larger herds, and susceptibility to dis-

JOHN B. HERRICK is professor of animal husbandry and extension veterinarian.

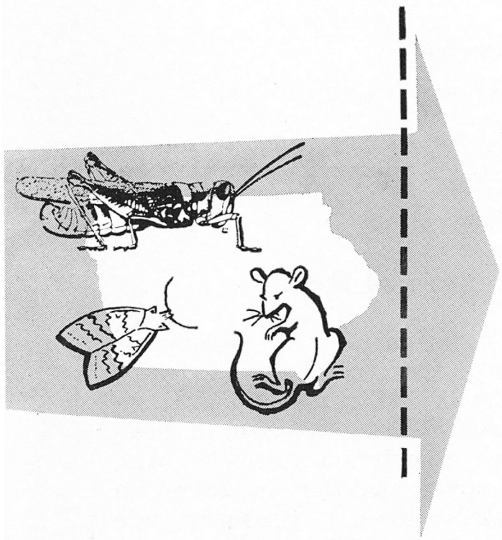
ease seems to increase as the tempo of production increases.

When you're aiming for high yields or gains, pay attention to rations, shelter, water availability, breeding and disease-control preventatives. All of these factors are important and very closely related in efficient livestock production.

Service Facilities . . .

Conditions for veterinary service have never been better. There are more veterinarians in the state than ever before. The new Iowa State College Veterinary Diagnostic Laboratory is completed and in use at Ames. Over 50 veterinarians are setting up laboratories in their own offices over the state for accurate diagnoses and prompt service to their clients.

The recently authorized Federal Animal Disease Research Laboratory is to be located in Iowa near Ames. This is to be a national disease research laboratory and will not replace activities in this field which already exist in the state. In addition to being centrally situated for the nation, location of the laboratory here also recognizes our high livestock population and the existing facilities and personnel of Iowa State's Division of Veterinary Medicine. Because of the time needed for construction and equipping the laboratory, officials estimate that it won't be fully functioning until 1959.



Insect and Rodent Prospects for 1957

Biggest "bug news" this year is the possibility that the spotted alfalfa aphid may invade Iowa in force. *Exact* predictions of pest outbreaks aren't possible. But, considering weather, here's the 1957 situation.

by Harold Gunderson and J. H. Lilly

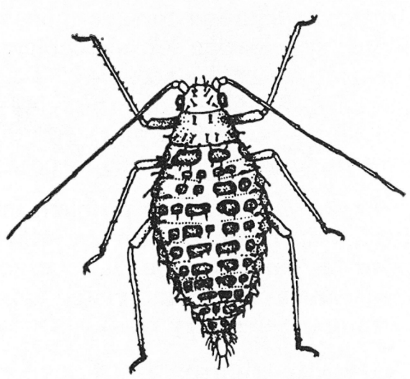
EXACT PREDICTIONS of pest outbreaks for even a month in advance aren't always possible. But the potentialities for outbreaks can often be recognized and considered in advance for the next growing season. Weather and various other factors determine the extent to which the *potentialities* become *realities*.

We don't know for sure all the causes of insect outbreaks. Sometimes we expect them, and they don't materialize. Weather conditions in southern Iowa, for example, apparently have favored chinch bugs for 2 or 3 years. Yet, the chinch bug buildup we expected hasn't developed. Also, an unexpected buildup may occur—especially when an aggressive pest like the corn borer gets a favorable "break" in the weather. Two or 3 very favorable nights for egg-laying at the time most of the female moths are flying always favor a borer buildup.

Spotted Alfalfa Aphid . . .

Insect pests are often amazingly "successful" when they enter a new territory. Iowa losses to the corn borer in 1949, only 7 years after this insect entered the state, are well remembered. This is one of the reasons we're very much concerned about the spotted alfalfa aphid which was found over most of the state in 1956. It resembles the corn borer in that it attacks a major crop. It differs in that it may not live over the winter in Iowa. However, it can be wind-borne into the state from the South any time during the growing season, and its capacity to propagate itself is almost beyond comprehension.

The spotted alfalfa aphid is new to Iowa and relatively new to North America. It's unique among the plant lice because of the extreme damage it inflicts on plants. The excessive honeydew deposited on plants actually makes mowing difficult. Alfalfa seedlings have been killed outright in just a few hours—apparently from toxins injected by the aphid during feeding. Just how serious this pest will



SPOTTED ALFALFA APHID

This tiny plant louse, rated as the most destructive alfalfa pest in North America, has moved into Iowa. Both winged and wingless forms are common.

HAROLD GUNDERSON and J. H. LILLY are professors of entomology.

be in Iowa remains to be seen, but it's certainly the biggest "bug news" right now.

The spotted alfalfa aphid is smaller than the common pea aphid with which it's usually found. Its color is a pale, yellow-gray. The common pea aphid is a vivid green. The spots on the back of the spotted alfalfa aphid are easily seen with slight magnification; they're usually visible to the naked eye. Very similar spotted aphids were found on both red clover and sweetclover in Iowa in 1956, but they caused little damage on these crops.

The Control Picture . . .

Man takes part in deciding insect abundance through the use of insecticides and other control measures. This role should increase as control measures improve, and we think this is happening. For example, some areas in southern Iowa had one female grasshopper laying eggs last fall where there might have been 100 if widespread insecticide applications hadn't been made. This doesn't mean that there aren't a lot of grasshopper eggs present. Grasshoppers are expected to be our No. 1 insect problem in 1957.

Blister beetle populations follow grasshopper numbers because the larvae of these insects feed mainly on grasshopper eggs. Thus blister beetle larvae are beneficial, though the adults are sometimes pests of alfalfa, potatoes and other crops. They were so common in some Iowa alfalfa fields in 1956 that cattle refused to eat fresh-chopped forage from these fields, apparently because of mouth irritation. Blister beetles will be abundant in Iowa in 1957.

Chemical control can and should change the picture for some of our more destructive pests, even more in 1957 than it has in the past. Highly effective soil insecticides have been used on about 1 acre out of every 8 planted to corn in the state during the past 2 years. They're so cheap and easy to use—especially when combined with starter fertilizers—that they're being looked at more and more as crop insurance. Granular insecticides are fully as effective and easier to use than sprays for corn borer control. Some new insecticides and repellents have been approved for fly control. Among them are Diazinon as a residual in dairy barns and "R-11" as a repellent in oil-base fly sprays used on livestock.

Prospects for 1957 . . .

Here's the way we view the prospects for the more important pests in 1957.

Field crop insects: The spotted alfalfa aphid, grasshoppers and blister beetles have been covered briefly. See table for a summary of the prospects for these and other leading pests of our cereal and forage crops.

Plant lice (aphids): The spotted alfalfa aphid is expected again in 1957 but probably not early enough to destroy spring seedings. Pea aphids were abundant in alfalfa during the late summer and the fall of 1956 so plenty of overwintering eggs are now in the fields. The corn leaf aphid is our most important sorghum pest in a normal year. All aphids have the ability to build up fast to great numbers if conditions are favorable.

Mites: These tiny pests aren't true insects. Both corn and soybeans were damaged in 1955, along with some garden crops. However, they were back to normal in 1956, and we have no good basis for a 1957 forecast. Mites are favored by hot, dry weather.

Flies: In a livestock state, we have to expect flies every year. Both sanitation and insecticides are vital in fly control, and each has a place on every farm.

Rodents: Ground squirrels and field mice seem to be in the "up" phases of their population cycles. Heavy rat populations are becoming hard to find because so many farmers are using dry warfarin baits to good advantage. Pocket gophers are holding their own because of relatively little practice of control measures.

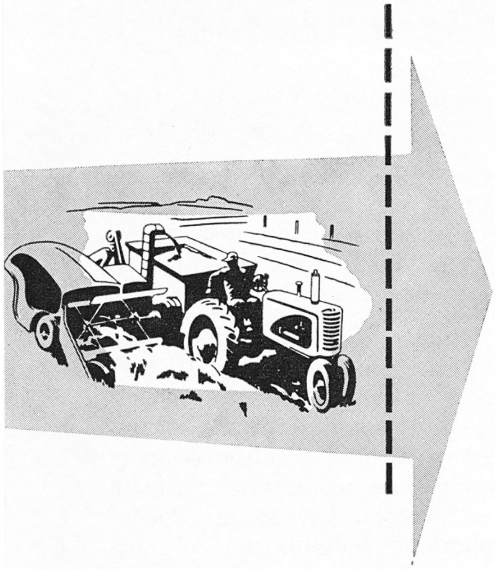
Insecticide Pointers . . .

Plenty of insecticides will be available in 1957 if you order early. Dealers are hesitant about stockpiling large reserves which they may not be able to move. A general outbreak of cutworms, armyworms or clover leaf weevil usually comes with little warning, with the result that local supplies of insecticides are soon used up.

A comment on pesticide residues is pertinent here. The Miller Bill is expected to be in full force in 1957. This bill sets up procedures for setting up residue tolerance of pesticides on all foods and feed. For the protection and safety of all concerned, *read, understand and follow the directions and precautions* printed on the labels.

Prospects for Some Common Field Crop Insects, Iowa, 1957.

Insect	Area of state	Infestations	
		If normal spring	If dry spring
Grasshoppers	Entire state	Moderate to heavy	*Very heavy*
Chinch bug	Southern ⅓	Light	Moderate
Corn borer	Entire state	Moderate to heavy	Moderate to heavy
Cutworms	Northern ⅔	Moderate to heavy	Moderate
Sod webworms	Northern ⅔	Moderate	Moderate
Rootworms	Entire state	Moderate to heavy	Moderate
Wireworms	Entire state	Local increases	Light
Spittle bugs	Eastern ½	Increasing	Increasing
Corn earworm	Entire state	*Heavy*	*Heavy*
Blister beetles	Entire state	*Heavy*	*Heavy*
Spotted alfalfa aphid	Entire state	Increasing	Moderate to heavy
Hessian fly	Entire state	Very light	Very light
White grubs	Entire state	Light	Light
Corn leaf aphid	Entire state	Moderate	Moderate



Farm Custom Rates for 1957

Successful use of farm equipment on more than one farm depends on custom rates that are fair to both parties. The information in this article may help you in figuring your custom work costs during 1957.

by Ray E. Armstrong and Dale O. Hull

WHEN YOU find your farm income reduced, it's wise to look for possible cost economies. Whether your operations are your own or custom hired, consider things like combining several operations into one. Doing two or more jobs at one time, such as preparing a seedbed by pulling several implements in tandem, is an example.

There are cost-saving possibilities on every farm. Whether yours are the same as your neighbors' depends on your own individual situation. In any case, we recommend that you look over and seek out cost-saving prospects on your own farm. Some things may have to be balanced off against others. But remember that you'll generally be ahead wherever you can do the same job that you have been doing at a lesser cost.

Custom Work . . .

Using custom work and machinery is an important means of cutting machinery investments and costs on Iowa farms. It's particularly advantageous on farms without a large acreage over which to spread fixed costs.

The going market price or rate for custom hire is determined by the number of operators willing to supply custom service and by the number of operators seeking custom services. Supply and demand determine the market rate. If you live where a rate is established by a market, you can consider that one proper.

A market, however, isn't always established in a particular area. In some places, certain types of equipment aren't hired enough to determine market prices. And often the transaction is between parties not wishing to bargain for all they can get. They want, instead, to arrive at a rate fair to both.

Because conditions vary, there just isn't a magic formula that will give an equitable custom rate to fit all conditions. But a method based on cost, plus a margin for risk and management, can be useful in many cases. This is the purpose of our rate guide.

On the college farms near Ames and Ankeny, the Farm Services provide most of the field production services involving the use of tractors and other machines. Jobs vary from plowing to hauling manure. All work is on a custom basis, and costs are charged back to the departments for which the work is done.

At the beginning of each year, we prepare an adjusted schedule of service rates. Each charge is determined by anticipating increases or decreases based on several years' records. Labor costs are carried as a separate item in our rates, but are included in the figures in the table.

The custom rate guide is based upon the approximate unit cost of work done under favorable conditions at 1956 Farm Services rates. Under highly *favorable* conditions (large fields, long rows, good soil conditions, etc.) costs would be less than shown in the guide. Likewise, under *unfavorable* conditions (small or irregular fields, small quantities, long hauls or special handling) costs may be considerably higher. All labor is billed at $1.30 per hour, even though actual wages paid the worker may vary.

How to Use Guide . . .

The costs in the table represent actual costs to the College Farm Services. The rates *include* depreciation, interest on investment, housing, federal excise taxes, repairs, servicing, fuel, lubricants and labor. These costs do *not* include charges for ownership risk and profit. These are necessary items, however, for the custom operator who expects to stay in business.

College Farm Services costs should be increased from 25 to 40 percent to give the operator a reasonable profit and to protect him against the risks of ownership and unforeseen complications. Such complications might include accidental damage while transporting on highways, exceptional damage because of rough or stony fields, irregularly shaped fields, increased operating costs because of wet fields or dry soil, or small jobs requiring frequent moves. The custom operator should also realize a reasonable profit for management and skill.

Costs shown in the table are also quite likely lower than the actual cost to the custom operator. Tax-free purchases of fuel by tank car or truck save us 8 to 10 cents per gallon. Savings averaging 10 percent are realized on all repairs purchased. And our purchase price on individual tractors and implements is somewhat less because of discounts on new list prices resulting from direct-factory purchases.

In addition, the Farm Services make very limited use of manufacturers' experimental machines for which no charge is made. On the other hand, we must buy and maintain many special machines and perform unusual services. Some of this special work is done at less than cost, and the loss is charged against the operations listed in the table.

Relatively high annual use of our machinery is another reason our actual costs might be lower than those of the custom operator. For example, last year we serviced more than 3,000 acres of cropland. Thus, the fixed costs on our machinery were spread over a fairly large acreage in the case of most operations.

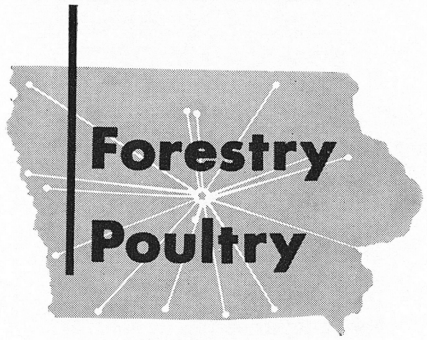
RAY E. ARMSTRONG is assistant professor of agricultural engineering and manager of the College Farm Services. DALE O. HULL is associate professor of agricultural engineering and extension agricultural engineer.

Farm Custom Rate Guide—1957

Farm operation	College Farm Service cost[1]	Suggested operating margin (percent)	Suggested range in actual charge Actual charge depends upon individual conditions, favorable or unfavorable.
TILLAGE			
Chiseling (18" deep, 40" spacing)	$2.40 per acre	25	$3.00 to $3.40 per acre
Plowing: 2-bottom plow	3.00 " "	25	3.50 to 4.00 " "
Plowing: 3-bottom plow	2.60 " "	25	3.00 to 3.50 " "
Disk harrow, 10-foot tandem	1.08 " "	25	1.25 to 1.50 " "
Drag harrow, 20-foot	0.61 " "	20	0.70 to 0.85 " "
Packing, double-gang corrugated roller	0.87 " "	30	1.00 to 1.25 " "
Spring-tooth harrow	0.93 " "	25	1.15 to 1.30 " "
PLANTING			
Drill, small grain, 10½-foot	1.00 " "	25	1.20 to 1.40 " "
Fertilizer drill, grain and fertilizer 10½-foot	1.50 " "	30	1.90 to 2.25 " "
Seeding alfalfa, clover, grasses, cultipacker seeder	1.00 " "	30	1.20 to 1.40 " "
Plant, row crop, drill: 2-row	1.50 " "	20	1.80 to 2.15 " "
4-row	0.95 " "	20	1.15 to 1.40 " "
Plant, check row: 4-row	1.35 " "	25	1.70 to 2.00 " "
4-row and fertilizer	1.60 " "	25	2.00 to 2.40 " "
CULTIVATION			
Weeder, 4-row	0.65 " "	20	0.75 to 0.90 " "
Rotary hoe, 2-row	0.95 " "	20	1.15 to 1.40 " "
Cultivate shovel or sweeps: 2-row	1.35 " "	25	1.60 to 2.00 " "
4-row	1.05 " "	25	1.25 to 1.50 " "
with side-dressing	1.50 " "		
HARVESTING			
Corn picking, 2-row	4.05 " "	40	5.00 to 6.00 " "
Picker-sheller, add 2c per bu.			
Hauling from field, elevating and binning	0.05 per bu.	35	0.06 to 0.07 per bu.
Combining, direct or pickup	4.00 per acre	40	5.00 to 6.00 per acre
Windrowing	1.60 " "	40	2.00 to 2.40 " "
Forage harvesting: corn or sorghums field cut	6.10 " "	40	7.50 to 9.00 " "
grass and legume field cut	4.65 " "	40	5.50 to 7.50 " "
Haul, elevate or blow and pack silage	1.50 per ton	40	1.50 to 1.90 per ton
Shell corn	0.03 per bu.	35	0.03 to 0.04 per bu.
HAYING			
Mowing	1.30 per acre	25	1.50 to 1.80 per acre
Raking hay	1.00 " "	25	1.10 to 1.40 " "
Loading and hauling loose hay	2.80 " "	20	3.50 to 4.20 " "
Baling, automatic field bale, including tie	3.20 per ton[2]	40	3.50 to 4.25 per ton
Pickup, haul and store bales	2.75 " "	30	3.25 to 3.90 " "
PROCESSING			
Grind shelled corn	0.06 per bu.		0.08 to 0.10 per bu.
Grind ear corn	0.07 " "		0.09 to 0.12 " "
Grind cobs for litter	0.20 per cwt.		0.25 to 0.35 per cwt.
Grind oats or small grains	0.07 per bu.		0.09 to 0.11 per bu.
Drying shelled corn and small grains[3]	0.05 " " plus ½c per bu. for each 1% moisture reduced		
FERTILIZING			
Load, haul and spread manure[4]	1.85 per ton	35	2.20 to 2.60 per ton
Spread commercial fertilizer broadcast	1.30 per acre	30	1.45 to 1.85 per acre
SPRAYING			
Spray 2,4-D (corn or flat work includes 2,4-D)	2.25 " "	30	2.60 to 3.15 " "
Spray corn borer (no materials furnished)	0.50 " "	30	0.65 to 0.75 " "
Spray DDT, fly control in buildings and around lot, men (no materials)	3.50 per hour	30	3.60 to 4.50 per hour
MISCELLANEOUS			
Clip pastures	1.35 per acre	30	1.60 to 1.90 per acre
Clip roadsides	1.50 " "	40	2.00 to 2.50 " "
Cut cornstalks, rotary cutter	2.15 " "	35	2.60 to 3.15 " "
Bore post holes	0.20 each	30	0.25 to 0.30 each
Clearing brush[5]			0.40 per 100 sq. ft.
Hedge rows			15.00 per 100 linear ft.
Sawing wood, chain saw	3.00 per hour	40	4.00 to 5.00 per hour

[1]Based on cost accounting experience. (Includes depreciation, interest on investment, housing, federal excise taxes, repairs, servicing, fuel and labor.)
[2]60-pound bales, 32 to 34 bales per ton.
[3]Does not include transportation or handling.
[4]Average length of haul 2 miles one way.
[5]Iowa Highway Commission schedule.

YOUR EXPERIMENT STATION REPORTS . . .



Oak Wilt Fungus Spreads in Spring

THE OVERLAND spread of oak wilt occurs only during the spring —from early April to late June. This was found in a recent research study conducted by the Iowa Agricultural Experiment Station.

This fungus spread to wounded healthy oaks during the spring whenever fungus-bearing dead trees were in the general area. The spread was apparently caused by the sap- and fungus-feeding insects that frequent the fungus-bearing mats on dead trees and wounds on healthy trees.

Experimental transmission studies have shown that some of these insects do carry the fungus and can spread it to wounds on healthy oaks. The wounds remain infectable for 2 weeks after being made. Painting the wounds with standard tree wound-dressings makes them unattractive to insects and shows some promise as a control method under shade tree conditions.

This study was made in cooperation with the Iowa State Conservation Commission and the USDA. The scientists involved in the research included H. S. McNabb, Jr., W. H. Bragonier, H. M. Harris, A. L. McComb, J. C. Gilman, L. H. Tiffany, D. M. Norris, Jr., and A. W. Engelhard.

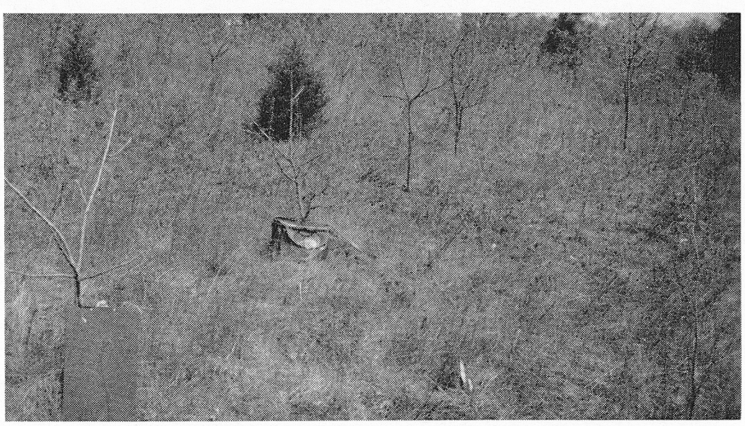
Seek Soil Needs For Black Walnut

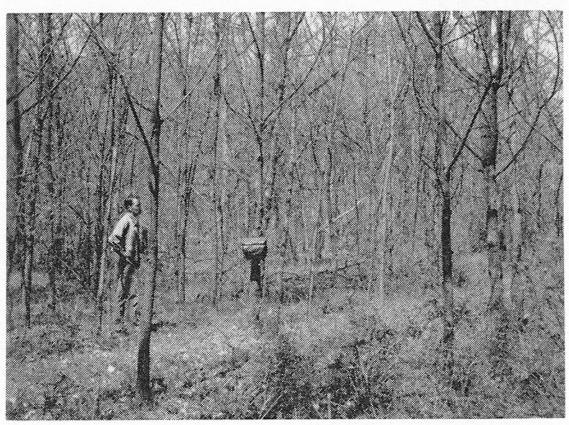
SOIL AND SITE requirements of black walnut trees in southeastern Iowa are being studied at the Experiment Station. In addition to soil and plant tissue analyses, field and pot fertilizer experiments have been carried out. The work to date shows that the problem is complex, report A. L. McComb and G. W. Thomson who are conducting these studies.

Good yield of black walnut plantations in terms of height growth seems, at this stage, to be closely related to the amounts of potassium, calcium and magnesium available to the tree. Nitrogen, as analyzed in the foliage, is moderately effective in increasing yield under natural conditions. Phosphorus shows no meaningful relation to tree growth. In experiments so far, it hasn't been possible to show clearly an increase in yield by adding any of these nutrients to a soil typical of those studied.

Find Best Markets For Iowa Timber

THE BIGGEST market for Iowa's farm timber is provided by the state's more than 1,000 sawmills, according to a survey conducted by A. L. McComb, James G. Yoho and co-workers at the Iowa Agricultural Experiment Station. However, the survey showed that most of the market was provided by 225 of these mills which operated full time with an average annual production of 300,000 board feet.





LEFT: After 15 years of growth, black walnut trees on this acid, infertile, lower-slope site in Van Buren County are only 3 to 4 feet tall. RIGHT: In an adjacent area, with less acid and more fertile soil, walnut trees are over 25 feet tall. Forestry researchers at Iowa State College are studying the soil and site requirements for the growth of black walnut trees in southeastern Iowa.

By far the most important native species used in manufacture at the time of the survey was cottonwood with a greater volume used than the leading imported species, ponderosa pine. However, the total value of the ponderosa pine used was about twice that of the cottonwood. The majority of the cottonwood lumber went into the manufacture of car blocking, crating and boxes.

Other important native species marketed for manufacturing purposes in the study area in southeast Iowa were oak and soft maple. The oak lumber was used in a variety of products—mainly pallets, millwork and truck bodies. Almost all of the soft maple was used by furniture manufacturers. Total production of all mills was more than 90 million board feet in the year before the survey.

Most timber stumpage bought from farmers was purchased on a lump-sum basis rather than by the unit. Prices on timber ranged from $5 to $35 per thousand board feet, with prices in northeast Iowa averaging slightly higher than in other parts of the state. Farmers harvesting their own sawlogs obtained about twice as much per thousand as did those who sold on the stump.

Other markets for specialty timber provide somewhat better returns to farmers than the sawtimber market. Outstanding among these are the markets for walnut veneer logs and white oak stove bolts.

A considerable part of the annual production of Iowa's sawmills is custom work done for farmers. For this practice, most mills charged $22 per thousand board feet, or they took half of the lumber sawed. Also, Iowa farmers provided the best market for Iowa's sawmills. About half of their annual production is sold to farmers or returned to them after custom sawing.

In a survey of secondary markets for Iowa wood, results indicated that a sizable secondary market already exists for lumber made from native Iowa timber. Also, a substantially larger market could be captured if Iowa sawmills would adopt better manufacturing and marketing methods.

This is a typical Iowa sawmill from which primary forest products pass on to secondary manufacturers or back to Iowa farm operators.

McComb and Yoho report that many manufacturers expressed a willingness to substitute Iowa-produced lumber for imported material currently being used—if they could be assured of a consistent supply, properly manufactured. The leading objection to Iowa-produced lumber was that kiln-dried and surfaced material was not available.

Another study is in progress on the processing, use and marketing of lowgrade timber. One phase of the study is to test methods of charcoal processing. Also, a preliminary survey of the domestic and industrial markets for charcoal in Iowa was conducted. These surveys indicated that domestic consumption alone exceeded 500 tons during the 1955 season. Further, the domestic consumption rate is increasing annually, and retailers regularly suffer from a short supply during the peak season.

Wood chips, another product obtainable from low-grade timber, and wood paste are being tested as to their use for livestock bedding.

The United States Forest Service is cooperating with the Experiment Station in several phases of these studies.

Study Nutrition Of Young Chicks

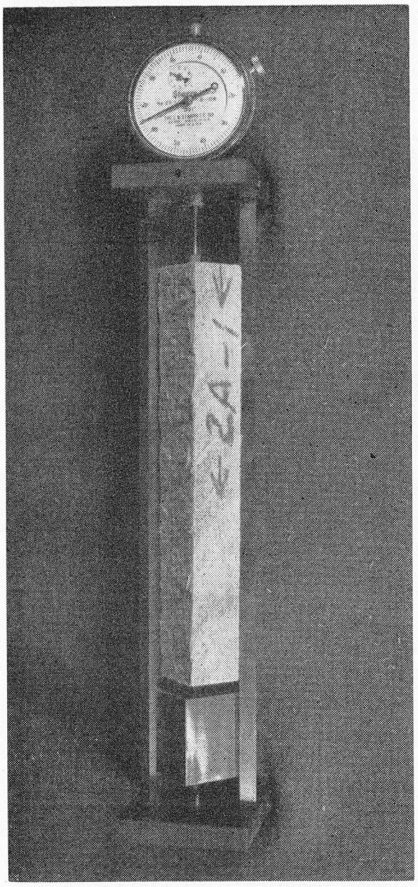
SEVERAL approaches are being used by research scientists at the Experiment Station to obtain information on the general problem of feed ingredients and nutritional factors involved in early chick growth.

Five experiments, involving 1,200 chicks, were conducted to learn the value of trichloroethylene-extracted meat scraps, expeller meat scraps and tallow in the diet of chicks. S. L. Balloun, who is directing the studies, reports that results of these experiments showed that both types of meat scraps usually improved chick growth when added at levels of 5 or 10 percent to corn-soybean oil meal diets. Dietary additions of tallow also improved chick growth. When chicks were grown to 12 weeks, 2 or 4 percent tallow in the diet improved feed conversion.

In another phase of the project, the protein requirements of the chick for maximum growth and feed efficiency and factors influencing these requirements have been studied. Amino acid availability in certain proteins and the influence of the dietary protein level on liver fat content were also studied.

A third study involved least-cost rations for broilers. Information from this study helps predict (1) least-cost rations for broilers of various weights with varying prices of corn and soybean oil-meal, (2) optimum marketing weights for various rations with different prices for broilers and feed and (3) least-time rations in relation to least-cost rations. The results were reported in the September 1956 issue of IOWA FARM SCIENCE.

Other phases of this project



This is the dial micrometer device used for testing longitudinal shrinkage in the studies of tension wood.

being studied are: the effect of various types of grit in the diet, possible sources of unidentified growth factors for chicks and the effect on the chick of dietary addition of enzymes.

Study Respiratory Diseases of Poultry

THE EXPERIMENT STATION is conducting basic studies on several respiratory diseases of poultry. Some of the studies underway are studies on: infectious bronchitis virus, evalution of immunity against Newcastle disease and infectious sinusitis of turkeys. M. S. Hofstad, who is directing this project, reports that future plans call for serological testing of representative samples from some Iowa chicken flocks for the presence of chronic respiratory disease.

Test Tension Wood In Hardwood Trees

AN ABNORMAL tissue known as tension wood is found on the upper side of leaning hardwood trees. Research workers at the Iowa Agricultural Experiment Station, in cooperation with the Forest Products Laboratory, have conducted a study to learn the effect of this tension wood on various wood properties. Some of the properties tested included the relation of tension wood distribution to specific gravity and longitudinal shrinkage (the special micrometer shown in the photo was used to measure longitudinal shrinkage).

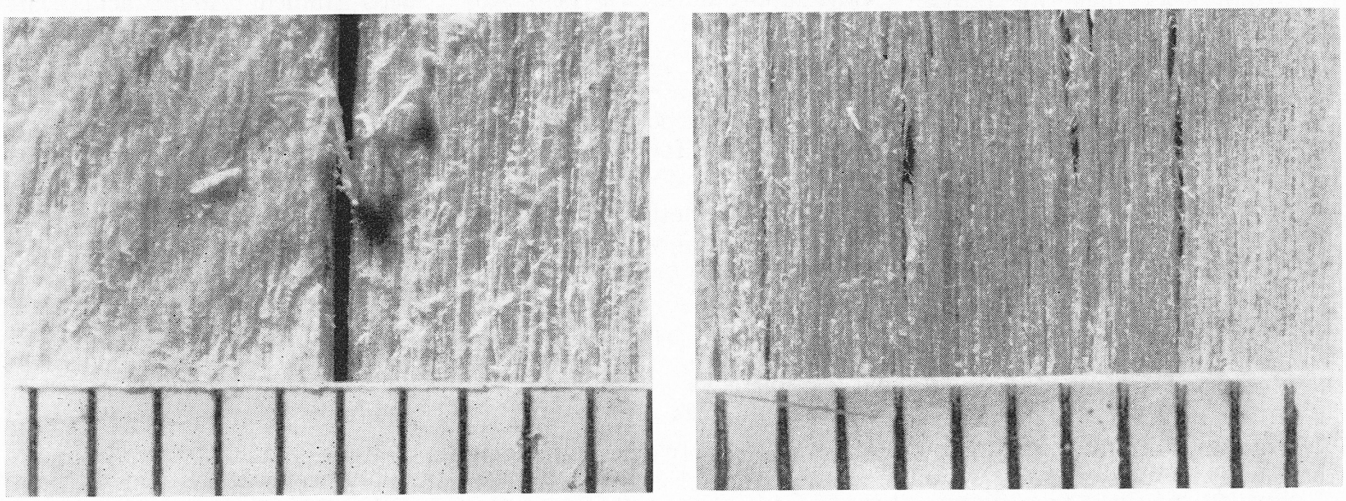
The relation of tension wood to the appearance, seasoning and machining of the wood was also studied. One fact brought out in these studies was that, after planing, tension wood was rougher, showed more chipmarks and more checks than normal wood. The sawed edges also were rougher on tension wood boards. D. W. Bensend, who directed these studies, reports that deviations in grain resulted in greater increase in roughness in the case of tension wood. This was particularly evident when the planer was cutting against the grain. These differences between the tension and the normal wood are shown in the photos.

Breed Chicken Strains Resistant to Leukosis

YOUR Experiment Station is conducting breeding experiments on chickens designed to establish strains of chickens more resistant to leukosis disease. The genetic nature of the project means that it will require many generations before resistant and susceptible lines of birds may be isolated. Breeding will be continued until the separation is definite and large enough to be experimentally useful, report J. W. Gowen, Janice Stadler, W. E. Haensly and E. C. Seu of the Department of Genetics.

In addition, the tissues of the resistant birds are being studied in search of evidence on why they may be resistant.

The leukosis tumor material has a genetic constitution of its own. This genetic constitution operates



LEFT: A tension wood board planed at 6-percent moisture content. Notice the projecting fibers. RIGHT: A normal board planed at 6-percent moisture content. Note the absence of projecting fibers when compared with the board from tension wood at left. (Ruler divisions are millimeters.)

on the genetic constitution of the chicken in causing the leukosis disease. Experiments show that the tumor undergoes mutation and that these mutations are selected by the chicken so that the more virulent survive.

In the course of the breeding experiments, supporting experiments will be conducted to obtain information on the effects of selection on the tumor material's virulence, on the relation of the amount of tumor material required for tumor initiation and on the use of genetic and immunological factors in producing resistant birds.

Test Protein Levels In Turkey Diets

PROTEIN LEVELS ranging from 21 to 31 percent in the diets of turkey poults have been studied by S. L. Balloun and R. E. Phillips of the Experiment Station. The purpose of the study was to learn how the different protein levels affected gains, feed efficiency and cost of gains of poults to 6 weeks of age. Lysine supplementation also was studied. "Best" growth was achieved with 25-percent protein diets. About the same conclusions were reached for feed efficiency and feed cost per pound of gain for poults to 6 weeks of age.

Another experiment covered the growth period from 6 to 12 weeks. Protein levels ranged from 14 to 24 percent. A 22-percent diet with no added lysine produced "best" gains in this period. When supplemented with 0.1-percent DL Lysine, a 20-percent protein ration was as effective as diets containing higher levels of protein. Considering feed efficiency and feed cost, the diets containing 20-percent protein were "best." Supplementing the diets with DL Lysine reduced the protein needed for most efficient and cheapest gains by about 2 percent.

In a third experiment, protein levels of 10 to 20 percent were studied in diets of turkey poults from 12 weeks to maturity. Protein required for "best" growth gradually decreased from 20 percent in the 12- to 16-week period to no more than 14 percent in the 20- to 24-week period. Greatest feed efficiency was achieved at lower protein levels.

This photo shows the thulium x-ray unit described in the item below and the method by which it is attached to a tree. The film holder is placed opposite the thulium unit on the tree. From the x-ray photo obtained, it's possible to determine presence of rot in the tree.

Closed Buckets Can Help Retain Egg Quality

GATHERING EGGS in a bucket which can be sealed can maintain interior egg quality better than gathering eggs in a wire basket—if the moisture content of the air in the bucket can be kept at a minimum.

This conclusion is based on a research study conducted by the Iowa Agricultural Experiment Station on factors affecting egg white quality under laboratory conditions. O. J. Cotterill and R. E. Phillips, who did the research, report that if the pH of egg white is not permitted to rise above 7.8 to 8.0 the thick white gel structure of the egg is not destroyed. Merely retaining the carbon dioxide which is initially in the egg will produce this effect.

If sealed buckets are used, carbon dioxide loss from the egg is reduced. After removing the eggs from the bucket, later deterioration of the thick white structure is slowed down. Holding eggs in an atmosphere containing 15 percent carbon dioxide for 2 days also slows down deterioration. However, mold and off-odors develop if the eggs are kept in a closed bucket more than 48 hours and moisture of surrounding air isn't controlled.

Another point brought out by this study was that reducing air circulation by holding eggs in a sealed container or adding carbon dioxide to the atmosphere surrounding the eggs will slow down egg quality loss as effectively at room temperature as under refrigeration with ventilation.

Use Thulium X-Rays To Test Tree Decay

ONE PROBLEM in determining the rate of decay of tree species is to avoid damaging the trees tested. Research on the development of nondestructive techniques to determine decay on standing timber has yielded favorable results when a thulium x-ray unit is used, reports H. S. McNabb, Jr., of the Experiment Station. This x-ray unit is very compact and contains a pellet of radioactive thulium metal which produces a radiation effect comparable to that of an equivalent 100 Kvp x-ray machine.

To test for decay in timber, the unit is secured to the bole of the tree opposite a film holder. The energy source is pivoted from inside the lead sheath to the bark surface. This exposes the film and x-rays the tree. Non-uniform density areas on the developed film indicate the presence of defects such as rot.

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How Much Tractor Fuel for Field Work?

AGRICULTURAL engineers at Iowa State College get many requests for a method to estimate the amount of tractor fuel needed for various field operations. There just isn't any really simple way to do this. But here's some help:

The information in the table was prepared as a class problem by some of the student agricultural engineers at Iowa State. The method used to compute amounts of fuel used is based on the minimum number of horsepower hours per acre to do each of the operations shown.

To estimate the *minimum* amount of fuel needed to raise *1 acre* of a crop: Using the figures in the table, total the number of horsepower hours required and then work out the formula at the bottom of the table. For "rate fuel is used" and "weight of 1 gallon," *be sure* to use the figures based on the kind of fuel you use in your tractor. To estimate the minimum fuel required per acre for one or more specific operations, do the same, but use only the number of horsepower hours applying to particular operations.

The results will represent the *minimum* amounts of fuel you can expect to use. If the ground is dry, you may use considerably more horsepower hours for plowing—up to 50 or even 70 percent more than the estimate. In wet years you might have to disk several times before planting; you might have to cultivate more often to keep down weeds; harvesting or combining may be "tougher." All of these would increase horsepower requirements and, hence, fuel needs.

In particularly difficult years, you might use half or three-quarters again as much fuel as the minimum estimates arrived at through the figures in the table. About the only way to adjust for special conditions is by an "educated guess."

Power requirements for chore jobs (grinding, for example) are even more difficult to evaluate than for field operations, and no information is included for chore operations of this type.

Data for Estimating Minimum Amount of Fuel Required to Grow 1 Acre of Corn, Soybeans or Oats

Operation	Drawbar horsepower hours per acre for any tractor		
	Corn	*Soybeans*	*Oats*
Plowing	12.0	12.0	6.6
Disking (tandem)	3.3	3.3	0.9
Harrow	0.9	0.9	0.3*
Planting (4-row)	0.9	0.9	...
Weeder (4-row)	0.8	0.8	...
Drilling (10′ fertilizer-grain)	...	...	2.0*
Cultivations			
1st (2-row)	1.5	1.5	...
2nd (2-row)	1.6	1.6	...
3rd (2-row)	1.5	1.5	...
Harvesting	4.0	4.0	4.0
Hauling and storing	1.0	1.0	1.0
Total horsepower hours per acre	27.50	27.50	14.80
Estimated fuel (gasoline) used to grow one acre of crop	3.36	3.36	1.80

*Estimated.

Fuel	Weight of fuel (lbs. per gal.)	Rate fuel is used by your tractor (lbs. per horsepower hour)
Propane	4.25	0.65
Gasoline	6.15	0.75
Tractor fuel	6.50	0.80
Diesel fuel	7.08	0.60

$$\frac{\text{Total horsepower hours} \times \text{rate fuel is used}}{\text{Weight of 1 gallon}} = \text{Minimum fuel requirement.}$$

Example: For normal operation, a tractor will use an estimated 0.75 lb. gasoline per horsepower hour. A gallon of gasoline weighs approximately 6.15 lbs.

For growing 1 acre of corn: $\frac{27.5 \times 0.75}{6.15} = 3.36$ gal. per acre.